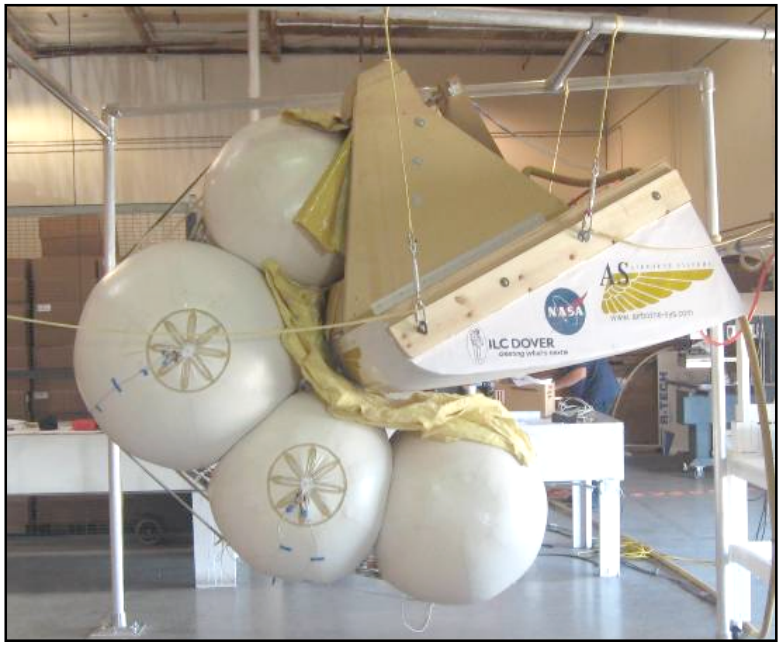
Orion Weekly Summary

Week ending August 8, 2008

The Landing and Descent Project conducted stowage and deployment tests of the Contingency Land Landing airbag assembly prototype (Photo below and right). The test objective was to demonstrate that the wrap-around air bag system can be packed in the allocated stowage volume, and be subsequently released and inflated around the geometry of the Crew Module heat shield shoulder in 10 seconds.



Two tests were conducted to demonstrate inflation. In both cases the airbag assembly was inflated to its design pressure of 6.5 psi. Prior to each test the airbag was packed into an aluminum stowage pan that matches the volume and shape of space allocated.

The Service Module Thermal Team presented results of an in-house study of the "Egg Crate" Propulsion System Assembly (PSA) as input for Orion's evaluation of thrust oscillation impacts. The "Egg Crate" is an alternate PSA concept that allows for significant decoupling of the PSA tank dynamic response from the thrust oscillation forcing function. This is done by adding a structural skin around the PSA to make it rigid, while keeping the radiators non-structural. The additional mass that may come with adding an outer skin is intended to be offset by the elimination of Micrometeoroid Orbital Debris (MMOD) blankets. The term "Egg Crate" comes from the shape of the aft bulkhead, similar to the skin around the PSA, and doubles as an inner MMOD wall. Modal, structural, MMOD, thermal and mass assessments were performed, comparing the Egg Crate to the baseline design. The assessments showed the potential of 140 lbs of mass savings relative to the Baseline PSA for the Lunar Sortie mission (200 lbs for Lunar Outpost), due to the outer skin reducing the need for MMOD shielding and thermal blankets. Significant room was made available in the avionics ring at the expense of reduced clearances in the PSA. Issues remaining with the Egg Crate design will be addressed.

The Launch Abort System Abort Motor team partnered with Marshall Space Flight Center (MSFC) Materials and Processes to evaluate the CLRF-100 fabrication/fusion resin used on the Abort Motor composite case. EPON Resin 828 is an industry standard used as a baseline material when evaluating new resin. Hydro-burst tests will be performed on test articles made with CLRF-100 resin and EPON Resin 828. All preparation and testing will take place in-house at MSFC beginning August 15.

Three of the four solar array test coupons provided by ATK completed testing at plasma levels that replicate the level of exposures that are expected for LEO and GEO environments in the NASA Glenn Plasma Interaction Facility. Preliminary results indicate that all three coupons passed the LEO charging and arcing criteria. This indicates that the array performance will not be altered by the plasma environments that they will be exposed to in space. Final assessments, including GEO results, are in progress and a full report will be available upon conclusion of testing and post-test analyses.

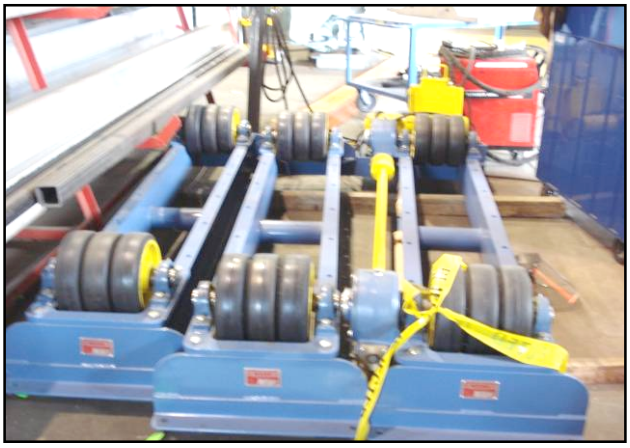
Low Impact Docking System (LIDS)
Testing continued putting the LIDS ring gear through numerous cycles while noting efficiency and wear patterns at regular intervals to better understand long term material behavior. The ring gear is required element of the LIDS structural latching system to allow opening and closing during a hard dock.

The Launch Abort System (LAS) "Pathfinder" rocket body section was delivered to Langley Research Center. The LAS "Pathfinder" assembly fixture and nose cone returned to Langley from the contractor. Support rollers were received to support the LAS "Pathfinder" rocket body during fabrication and a checkout was conducted of the LAS "Pathfinder" trailer break-over fixture (Photos below).

Launch Abort System (LAS) adaptor for PA-1 at Langley Research Center

Break-Over Fixture used to rotate the LAS into position

AA-1 Crew Module Transportation Fixture with HALO (top part of structure)



Support Rollers for the LAS "Pathfinder"

White Sands Missile Range (WSMR)
Placing of sub grade, base course material and pre-cast perimeter trench drain sections around the launch pad is complete. All launch pad and gantry launch position pad lighting is operational.